Bachelor of Computer Applications

Proposed Scheme of Syllabus

(CHOICE BASED CREDIT SYSTEM)

W.E.F ACADEMIC SESSION 2021-22

BACHELOR OF COMPUTER APPLICATIONS
(BCA) DEGREE

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY
SECTOR-16C, DWARKA, NEW DELHI-110078

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I. BACHELOR OF COMPUTER APPLICATIONS PROGRAMME DETAILS

1. Aim:

The programme covers rudimentary to advance concepts in Computer Science and its applications in various domains. An exceptionally broad range of topics covering current trends and technologies in the field of information technology and computer science are included in the syllabus. The hands on sessions in Computer labs using various Programming languages and tools are also given to have a deep conceptual understanding of the topics to widen the horizon of students' self- experience.

Students, who choose BCA Programme, develop the ability to think critically, logically, analytically and to use and apply current technical concepts and practices in the core development of solutions in the multiple domains.

The knowledge and skills gained with a degree in Computer Application prepare graduates for a wide range of jobs in education, research, government sector, business sector and industry. In broader perspective the mission of teaching BCA is to produce employable IT workforce, that will have sound knowledge of IT and business fundamentals that can be applied to develop and customize solutions for various Enterprises.

2. Programme Objectives:

It is envisioned that the graduates passing out BCA degree, will achieve the following objectives and will be able to

Programme Objectives (POs)	Description
PO1	Understand the fundamental concepts of Computers, Software hardware and peripheral devices and evolution of computer technologies.
PO2	Familiarized with Business environment and Information Technology and its Applications in different domains.
PO3	Gain knowledge to identify, explain and apply functional programming and object-oriented programming techniques and use of databases to develop computer programs.
PO4	Analyze, design, implement and evaluate computerized solutions to real life problems, using appropriate computing methods including web applications.
PO5	Understand the front end and backend of software applications.
PO6	Gain expertise in at least one emerging technology.
PO7	Acquire knowledge about computer architecture and organization, networks, network devices and their configuration, protocols, security concepts at various level etc.

PO8	Apply techniques of software validation and reliability analysis to the development of computer programs.
PO9	Acquire Technical, Communication and management Skills to convey or present information, applications, instructions, policies, procedures, decisions, documentations etc. verbally as well as in writing.
PO10	Recognize the various issues related to society, environment, health and vivid cultures and understand the responsibilities to contribute in providing the solutions.
PO11	Acquire technical skills to lead a productive life in the society as a professional or as an entrepreneur.

3. Programme Learning Outcomes:

The completion of the BCA Programme shall enable a student to:

i) To design, implement, and evaluate computer-based system, process, component, or program to meet desired needs by critical understanding, analysis and synthesis

ii) Identify applications of Computer Science in other fields in the real world to enhance the career prospects

iii) Realize the requirement of lifelong learning through continued education and research.

iv) Use the concepts of best practices and standards to develop user interactive and abstract application

v) Understand the professional, ethical, legal, security, social issues and responsibilities.

The detailed list of programme learning outcomes is as follows:

PLO	Attribute	Description
PLO1	Communication Skills	The student should be able to communicate the technical information both orally and in writing professionally.
PLO2	Use of Software Tools	Create, select, adapt and apply suitable tools and technologies to a wide range of computational activities.
PLO3	Technical Skills	Acquire necessary knowledge of technical, scientific as well as basic managerial and financial procedures to analyze and solve real world problems within their work domain
PLO4	Domain Awareness	Clarity on both conceptual and application oriented skills in commerce, Finance & Accounting and it Applications in Business context.
PLO5	Technical Support	Must be able to provide technical support for various software applications.
PLO6	Analysis and	Ability to analyze research and investigate complex computing

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	investigation of Complex Computing Problems	problems through design of experiments, analysis and interpretation of data and synthesis of the information to arrive at valid conclusions.
PLO7	Design / Development of Solutions	Apply the knowledge gained in core courses to a broad range of advanced topics in computer science, to learn and develop sophisticated technical products independently.
PLO8	Imbibe Cyber Ethics	Awareness on ethics, values, sustainability and creativity aspects of technical solutions.

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II. CHOICE BASED CREDIT SYSTEM (CBCS)

The CBCS provides an opportunity for the students to choose courses from the prescribed courses comprising core, elective/minor or skill based courses.

1. Types of courses in CHOICE BASED CREDIT SYSTEM (CBCS)

1.1 Core Course: A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course.

1.2 Elective Course: Generally a course which can be chosen from a pool of courses and which may be very specific or specialized or advanced or supportive to the discipline/ subject of study or which provides an extended scope or which enables an exposure to some other discipline/subject/domain or nurtures the candidate's proficiency/skill is called an Elective Course.

a) **Discipline Specific Elective (DSE) Course:** Elective courses offered by the main discipline/subject of study are referred as Discipline Specific Electives.

b) **Project work/Dissertation** is considered as a special course involving application of knowledge in solving / analyzing /exploring a real life situation / difficult problem. A candidate studies such a course on his own with an advisory support by a teacher/faculty member. The work done will have to be submitted in writing as a project report / dissertation.

c) **Generic Elective (GE) Course:** Elective courses that are generic or interdisciplinary by nature chosen from an unrelated discipline/ subject with an intention to seek exposure beyond discipline/s of choice are called Generic Electives. Students will have to choose one elective each in the third and fourth semester from the lists GE1 to GE2 given in this syllabus.

1.3 Ability Enhancement Courses (AEC)

The Ability Enhancement (AE) Courses are the course that lead to Knowledge enhancement. These are of two types.

a) **AE Compulsory Course (AECC):** Environmental Studies, English Communication/MIL Communication.

b) **AE Elective Course (AEEC):** AEEC courses are value-based and/or skill-based and are aimed at providing hands-on-training, competencies, skills, etc. These courses are to be chosen from a pool of courses designed to provide value-based and/or skill-based instruction.

III PROGRAMME STRUCTURE:

The BCA programme is a three-year course of 160 credits divided into six-semesters. A student is required to complete 150 credits for the completion of course and the award of degree.

	Academic Year	Odd Semester	Credits	Even Semester	Credits
Part – I	First Year	Semester I	26	Semester II	26
Part – II	Second Year	Semester III	27	Semester IV	27
Part – III	Third Year	Semester V	27	Semester VI	27

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Total Credits – 162	80		82

Eligibility Criteria: The detailed eligibility criteria for BCA programme for an academic session will be provided in the admission brochure. However, for quick reference, the eligibility criteria of BCA programme for academic session 2021-22 is as follows:
"Pass in 12th Class of 10+2 of CBSE or equivalent with a minimum of 50% marks in aggregate* with pass in English (core or elective or functional). Mathematics or (Computer Science / Informatics Practice / Computer Applications / Multimedia & Web Technology / Data Management Application / Web Application as compulsory subject of non-vocational stream with 50 theory and 50 practical ratio). OR Three year Diploma in a branch of Engineering from a polytechnic duly approved by All India Council for Technical Education and affiliated to a recognized examining body with a minimum of 50% marks in aggregate."

Admission Criteria: Admission shall be based on the merit of the written test /CET.

IV INSTRUCTION FOR QUESTIONS PAPER SETTER:

a) Question Paper setter for each course must refer the instructions provided with the detailed syllabus of the specific courses.
b) The question paper shall be preferably set from the prescribed text books and reference books, mentioned in the syllabus.

V CREDIT ALLOCATION (BCA PROGRAMME OF STUDY)

Course	**Credits**	
	Theory + Practical	**Theory + Tutorial**
	Core Course (6 credits) (12 papers)	**Core Course (4 credits) (7 papers)**
Core Course Theory 19 Papers	12x4=48	7x3=21
Core Course Practical / Tutorial* 19 Papers	12x2=24	7x1=7
Elective Course (4 Papers of 5 credits each, 5 Papers of 4 credits each and 7 Papers of 2 credits each)		
A.1. Discipline Specific Elective (4 Papers)	4x4 = 16	
A.2. Discipline Specific Elective Practical/Tutorial* (4 Papers)	1×4 = 04	
B.1. Generic Elective/ Interdisciplinary (2 Papers)		2x3 = 06
B.2. Generic Elective Practical/ Tutorial* (2 Papers)		2x1 = 02

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1.Ability Enhancement Compulsory Courses(AECC) (3 Papers of 4 credit each and 1 Paper of 6 Credit including Minor & Major Project)	1x4 + 1x6= 10	2x4=8
2. Ability Enhancement Compulsory Courses(AECC) (2 Papers of 2 credit)		2x2 = 04
Skill Enhancement Courses (SEC) (5 Papers of 2 credit each)	5x2 = 10	
Co-Curricular Activities	2	
Total credit 162	**114**	**48**

*Wherever there is practical, there will be no tutorial and vice-versa

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III. CBCS COURSE STRUCTURE FOR BCA PROGRAMME

1. SEMESTER WISE PLACEMENT OF THE COURSES

Semester	CORE COURSE (18)	Ability Enhancement Compulsory Course (AECC) (3)	Skill Enhancement Course (SEC) (2)	Elective: Discipline Specific (DSE) (5)	Elective: Generic (GE) (2)
I **Total Credits 26**	CC1 (4) Discrete Mathematics	AECC 1 (4) Technical Communication			
	CC2 (4+2) Programming using 'C' Language				
	CC3(4+2) Fundamentals of IT & Computers				
	CC4 (4+2) Web Technologies				
II **Total Credits 26**	CC5 (4) Applied Mathematics	AECC2 (2) Environment Studies	SEC -1 (2)		
	CC6 (4+2) Web Based Programming				
	CC7 (4+2) Data Structure And Algorithm Using 'C'				
	CC8 108 (4+2) Database Management System				
III **Total Credits 27**	CC9 (4) Computer Network	AECC3 (2) Human Values and ethics	SEC -2 (2)	DSE- 1 (4+1)	Any course from the list GE-1(4)
	CC10 (4) Computer Organization and Architecture				
	CC11 (4+2) Object Oriented Programming with C++				
IV **Total Credits 27**	CC12(4+2) Java Programming	AECC4 (4) Introduction to Management & Entrepreneurship Development	SEC-3 (2) Personality Development Skills	DSE -2 (4+1)	Any course from the list GE-2 (4)
	CC13 (4+2) Software Engineering				
V **Total Credits**	CC14 (4+2) Operating System & Linux Programming	AECC 5 Minor Project (4)	SEC-4 (2) Summer Internship	DSE -3 (4+1)	
	CC15(4+2) Computer Graphics				

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27	CC 16 (4) Cloud computing				
VI **Total Credits 29**	CC17 (4) Datawarehousing and Data Mining	AECC 6 Major Project (6)	SEC-5 (2) Seminar/ Conference Presentation	DSE -4 (4+1)	
	CC18 (4) E-Commerce				
	CC19 (4+2) Internet of Things				
	NSS / NCC / Cultural Clubs / Technical Society / Technical Clubs	Mandatory (2)			

1.1 Skill Enhancement Course 1(SEC)
SEC 1 (choose one) Skill development course from the following

(i) MOOC course from SWAYAM / NPTEL of minimum 2 credits. Certificate is Mandatory for the degree
(ii) Front End Design Tool VB.Net Lab
(iii) Statistical Analysis using Excel
(iv) Designing Lab Photoshop

SEC 2 (choose one)

(i) MOOC course From Swayam / NPTEL of minimum 2 credits. Certificate is Mandatory for the degree
(ii) Designing Lab CorelDraw
(iii) ASP.Net
(iv) AR/VR

1.2 Discipline Specific Electives (DSE) (Choose any One Group of DSE)

DSE-A – Data Science & Analytics

1. Basics of Python Programming
2. Introduction to Data Science
3. Data Visualization & Analytics
4. Machine Learning with Python

DSE-B – Artificial Intelligence & Machine Learning

1. Basics of Python Programming
2. Introduction to Artificial Intelligence
3. Machine Learning with Python
4. Deep Learning with Python

DSE-C– Cyber Security

1. Cyber Security
2. Network Security
3. Web Security
4. IT Acts and Cyber Laws

DSE-D – Software Development

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1. Basics of Python Programming
2. Web Development with Python
3. Web Development with Java & JSP
4. Mobile Application Development

1.3Generic Elective (GE) for BCA Students

GE 1 (choose any One)

(i) Principles of Management & Organizational Behaviour
(ii) Any One Paper Offered as open elective by other School /Department / Programme

GE 2 (choose any One)

(i) Digital Marketing
(ii) Principles of Accounting
(iii) Any One Paper Offered as open elective by other School / Department / Programme

1.4Generic (Open) Electives for other undergraduate programmes

The following Core courses of BCA programme may be offered as Generic Elective for other undergraduate programmes. Maximum number of students from other School / Department / Programme should not exceed 20% of total intake for the programme.

S.No.	Semester	Subject Code	Subject Name
1	I	BCA 105 BCA 173	Fundamentals of Computers & IT Practical – II IT Lab
2	I	BCA 107 BCA 175	Web Technologies Practical-III Web Tech Lab
3	II	BCA 108 BCA 176	Database Management System Practical – VI DBMS Lab
4	III	BCA 205 BCA 271	Object Oriented Programming using C++ Practical – VI C++ Lab
5	III	BCA 211	Basics of Python Programming
6	VI	BCA 304	E-Commerce

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SEMESTER WISE EVALUATION SCHEME

Based on the above-mentioned course categories the semester wise Evaluation scheme of BCA Programme will be as follows:

FIRST SEMESTER EXAMINATION

Code No.	Paper	Course Category	L	T/P	Credits	Marks Internal	Marks External	Max Marks
Core Course Theory								
BCA 101	Discrete Mathematics	Core Course Theory	3	1	4	25	75	100
BCA 103	Programming Using 'C' Language	Core Course Theory	3	1	4	25	75	100
BCA 105#	Fundamentals of Computers & IT	Core Course Theory	3	1	4	25	75	100
BCA 107#	Web Technologies	Core Course Theory	3	1	4	25	75	100
Ability Enhancement Compulsory Course (AECC)								
BCA 109	Technical Communication	AECC	3	1	4	25	75	100
Core Course Practicals								
BCA 171	Practical – I 'C' Prog. Lab	Core Course Practical	0	4	2	40	60	100
BCA 173#	Practical – II IT Lab	Core Course Practical	0	4	2	40	60	100
BCA 175#	Practical-III Web Tech Lab	Core Course Practical	0	4	2	40	60	100
Bridge Course (Mandatory for Students from Non Mathematics background)								
BCA 181^{+}	Bridge Course in Mathematics	Mandatory for Students from Non Mathematics background	2	0	0	Pass Grade	------	------
	Total Credits				**26**			**800**

$^{+}$ Non Credit subject mandatory for the students who do not have mathematics in 12th std. The student has to obtain at least pass marks (40). The examination of this paper shall be conducted by the concerned teacher teaching the course / paper as Teacher's Continuous Evaluation for total 100 marks. Only the Pass / Fail status is to be specified on the marksheet of the examination and the result of the student. Passing is mandatory for student not having mathematics in 12th std.

 # Generic Elective (GE) for other undergraduate programmes

TOTAL MARKS: 800

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SEMESTER WISE EVALUATION SCHEME

SECOND SEMESTER EXAMINATION

Code No.	Paper	Course Category	L	T/P	Credits	Marks Internal	Marks External	Max Marks
Core Course Theory								
BCA 102	Applied Mathematics	Core Course Theory	3	1	4	25	75	100
BCA 104	Web based Programming	Core Course Theory	3	1	4	25	75	100
BCA 106	Data Structure And Algorithm Using 'C'	Core Course Theory	3	1	4	25	75	100
BCA 108#	Database Management System	Core Course Theory	3	1	4	25	75	100
Ability Enhancement Compulsory Course (AECC)								
BCA 110	Environment Studies	AECC	2	0	2	25	75	100
***Skill Enhancement Course (AEEC) (Choose any One)**								
BCA 132	**MOOC course from SWAYAM / NPTEL	SEC-1	0	0	2	100	0	100
BCA 134	Front End Design Tool VB.Net Lab	SEC-1	0	4	2	100	0	100
BCA 136	Statistical Analysis using Excel	SEC-1	0	4	2	100	0	100
BCA 138	Designing Lab Photoshop	SEC-1	0	4	2	100	0	100
Core Course Practical								
BCA 172	Practical-IV WBP Lab	Core Course Practical	0	4	2	40	60	100
BCA 174	Practical – V DS Lab	Core Course Practical	0	4	2	40	60	100
BCA 176#	Practical – VI DBMS Lab	Core Course Practical	0	4	2	40	60	100
	Total				**26**			**900**

***NUES (Non – University Examination Subject) – Only Internal Assessment by the Institute)**

 # Generic Elective (GE) for other undergraduate programmes

TOTAL MARKS: 900

**Instructions for MOOC course

1. MOOC Course should be done from SWAYAM/NPTEL as per the guidelines of UGC.
2. For securing the credits, the student is required to complete the assessment of the course and to provide the certificate of the course done from SWAYAM/NPTEL.

3. The fees (if any) for the registration and/or assessment of the MOOC course must be borne by the student only.

4. If the student secures more than 2 credits for the MOOC Course even then 2 credits shall be considered for this subject and the grade/marks provided by assessing authority shall be transferred to the university by the institution where the student is studying. The University's Examination Division shall take the result of the MOOC course on record and a result declared for these papers. The student must submit the result of such papers to their respective institution. All the results for the MOOC courses may be submitted before the completion of other requirements including credits requirement.

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SEMESTER WISE EVALUATION SCHEME

THIRD SEMESTER EXAMINATION

Code No.	Paper	Course Type	L	T/P	Credits	Marks Internal	Marks External		Max Marks
							Th	Pr	
Core Course Theory									
BCA 201	Computer Network	Core Course Theory	3	1	4	25	75	0	100
BCA 203	Computer Organization and Architecture	Core Course Theory	3	1	4	25	75	0	100
BCA 205#	Object Oriented Programming with C++	Core Course Theory	3	1	4	25	75	0	100
Ability Enhancement Compulsory Course (AECC)									
BCA 207	Human Values and Ethics	AECC	2	0	2	25	75	0	100
***Discipline Specific Elective (Choose any One)**									
BCA 211#	Basics of Python Programming	DSE-1	4	1	5	25	50	25	100
BCA 213	Cyber Security	DSE-1	4	1	5	25	50	25	100
****Generic Elective (Choose any One)**									
BCA 221	Principles of Management & Organizational Behaviour	GE-1	3	1	4	25	75	0	100
BCA 223	Open Elective offered by other Department/School /programme	GE-1	3	1	4	25	75	0	100
*****Skill Enhancement Course (AEEC) (Choose any One)**									
BCA 231	****MOOC course from SWAYAM / NPTEL	SEC-2	0	0	2	100	0	0	100
BCA 233	Designing Lab CorelDraw	SEC-2	0	4	2	100	0	0	100
BCA 235	ASP.Net	SEC-2	0	4	2	100	0	0	100
BCA 237	AR/VR	SEC-2	0	4	2	100	0	0	100
BCA	Cyber Ethics	SEC-2	2	0	2	100	0	0	100

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239									
Core Course Practical									
BCA 271#	Practical – VII C++ Lab #	Core Course Practical	0	4	2	40	0	60	100
	Total				**27**				**800**

 # Generic Elective (GE) for other undergraduate programmes
*** First Subject from Discipline specific chosen group**
**** Choose one subject from list of GE-1**
***** NUES (Non – University Examination Subject) – Only Internal Assessment by the Institute) i.e. the assessment shall be conducted by the institution for all 100 marks as Teacher's Continuous Assessment**

****Instructions for MOOC course

1. MOOC Course should be done from SWAYAM/NPTEL as per the guidelines of UGC.
2. For securing the credits, the student is required to complete the assessment of the course and to provide the certificate of the course done from SWAYAM/NPTEL.
3. The fees (if any) for the registration and/or assessment of the MOOC course must be borne by the student only.
4. If the student secures more than 2 credits for the MOOC Course even then 2 credits shall be considered for this subject and the grade/marks provided by assessing authority shall be transferred to the university by the institution where the student is studying. The University's Examination Division shall take the result of the MOOC course on record and a result declared for these papers. The student must submit the result of such papers to their respective institution. All the results for the MOOC courses may be submitted before the completion of other requirements including credits requirement.

TOTAL MARKS: 800

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SEMESTER WISE EVALUATION SCHEME

FOURTH SEMESTER EXAMINATION

Code No.	Paper	Course Type	L	T/P	Credits	Marks Internal	Marks External		Max Marks
							Th	Pr	
Core Course Theory									
BCA 202	Java Programming	Core Course Theory	3	1	4	25	75	0	100
BCA 204	Software Engineering	Core Course Theory	3	1	4	25	75	0	100
Ability Enhancement Compulsory Course (AECC)									
BCA 206	Introduction to Management & Entrepreneurship Development	AECC	3	1	4	25	75	0	100
***Discipline Specific Elective (Choose any One)**									
BCA 212	Introduction to Data Science	DSE-2	4	1	5	25	50	25	100
BCA 214	Introduction to Artificial Intelligence	DSE-2	4	1	5	25	50	25	100
BCA 216	Network Security	DSE-2	4	1	5	25	50	25	100
BCA 218	Web Development Using Python and Django	DSE-2	4	1	5	25	50	25	100
****Generic Elective (Choose any One)**									
BCA 222	Digital Marketing	GE-2	3	1	4	25	75	0	100
BCA 224	Principles of Accounting	GE-2	3	1	4	25	75	0	100
BCA 226	Open Elective offered by other Department/ School /programme	GE-2	3	1	4	25	75	0	100
***Skill Enhancement Course (AEEC)**									
BCA 232	Personality Development Skills	SEC-3	2	0	2	100	0	0	100
Core Course Practical									
BCA 272	Practical –VIII Java Lab	Core Course Practical	0	4	2	40	0	60	100
BCA 274	Practical – IX SE Lab	Core Course Practical	0	4	2	40	0	60	100
	Total				**27**				**800**

* **Second Subject from Discipline specific chosen group**

** **Choose one subject from list of GE-2**

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***** NUES (Non – University Examination Subject) – Only Internal Assessment by the Institute) i.e. the assessment shall be conducted by the institution for all 100 marks as Teacher's Continuous Assessment**

Summer Training will be held for 4 weeks after the end of fourth semester. Viva-Voce will be conducted in fifth semester.

TOTAL MARKS: 800

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SEMESTER WISE EVALUATION SCHEME

FIFTH SEMESTER EXAMINATION

Code No.	Paper	Course Type	L	T/P	Credits	Marks Internal	Marks External		Max Marks
							Th	Pr	
Core Course Theory									
BCA 301	Operating System & Linux Programming	Core Course Theory	3	1	4	25	75	0	100
BCA 303	Computer Graphics	Core Course Theory	3	1	4	25	75	0	100
BCA 305	Cloud Computing	Core Course Theory	3	1	4	25	75	0	100
Ability Enhancement Compulsory Course (AECC)									
BCA 307	Minor Project	AECC	0	8	4	40	0	60	100
***Discipline Specific Elective (Choose any One)**									
BCA 311	Data Visualization & Analytics	DSE-3	4	1	5	25	50	25	100
BCA 313	Machine Learning with Python	DSE-3	4	1	5	25	50	25	100
BCA 315	Web Security	DSE-3	4	1	5	25	50	25	100
BCA 317	Web Development with Java & JSP	DSE-3	4	1	5	25	50	25	100
***Skill Enhancement Course (AEEC)**									
BCA 331	Summer Training Project	SEC-4	0	0	2	100	0	0	100
Core Course Practical									
BCA 371	Practical – X Linux - OS Lab	Core Course Practical	0	4	2	40	0	60	100
BCA 373	Practical – XI CG Lab	Core Course Practical	0	4	2	40	0	60	100
	Total				**27**				**800**

*** Third Subject from Discipline specific chosen group**

*****NUES (Non – University Examination Subject) – Only Internal Assessment by the Institute) i.e. the assessment shall be conducted by the institution for all 100 marks as Teacher's Continuous Assessment. Evaluation will be based on Summer Training held after fourth semester.**

TOTAL MARKS: 800

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SEMESTER WISE EVALUATION SCHEME

SIXTH SEMESTER EXAMINATION

Code No.	Paper	Course Type	L	T/P	Credits	Marks Internal	Marks External		Max Marks
							Th	Pr	
Core Course Theory									
BCA 302	Data Ware Housing & Data Mining	Core Course Theory	3	1	4	25	75	0	100
BCA 304#	E- Commerce	Core Course Theory	3	1	4	25	75	0	100
BCA 306	Internet of Things	Core Course Theory	3	1	4	25	75	0	100
Ability Enhancement Compulsory Course (AECC)									
BCA 308	**Major Project	AECC	----	12	6	40	0	60	100
***Discipline Specific Elective (Choose any One)**									
BCA 312	Machine Learning with Python	DSE-4	4	1	5	25	50	25	100
BCA 314	Deep Learning with Python	DSE-4	4	1	5	25	50	25	100
BCA 316	IT Act and Cyber Laws	DSE-4	4	1	5	25	75		100
BCA 318	Mobile Application Development	DSE-4	4	1	5	25	50	25	100
***Skill Enhancement Course (AEEC)**									
BCA 332	Seminar/ Conference Presentation	SEC – 5	0	0	2	100	0	0	100
Core Course Practical									
BCA 372	Practical – XII IOT Lab	Core Course Practical	0	4	2	40	0	60	100
$ BCA 374	NSS / NCC / Cultural Clubs / Technical Society / Technical Clubs	Mandatory	0	0	2	100	0	0	100
	Total				**29**				**800**

***Fourth Subject from Discipline specific chosen group.**

****The student shall do the Major project in the Discipline Specific Area/Curriculum based subject /any emerging technology.**

***** NUES (Non – University Examination Subject) – Only Internal Assessment by the Institute i.e. the assessment shall be conducted by the institution for all 100 marks as Teacher's Continuous Assessment .Evaluation will be based on the presentation on any latest**

technology/research article in in-house/external seminar/conference and will be conducted by the college committee only.

 # Generic Elective (GE) for other undergraduate programmes

$ NUES (Non – University Examination Subject) Comprehensive evaluation of the students by the concerned coordinator of NCC / NSS / Cultural Clubs / Technical Society / Technical Clubs out of 100 marks as per evaluation schemes worked out by these societies / organizations at the institution / University level. The coordinators shall be responsible for the evaluation of the same. These activities shall start from the 1st semester and evaluation shall be conducted at the end of 6th semester for the students admitted in the first semester.

Note: Any Elective Subject will be offered if minimum 1/3 rd of the total strength of students in the class will opt for it.

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Course Code: BCA 201 **L T C**
Course Name: Computer Networks **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following: -

1. To study different types of media, multiplexing, switched networks, the Internet, TCP/IP suite, fiber-optic communications and the state-of-art networking applications.
2. To develop an understanding of different components of computer networks, various protocols, modern technologies and their applications.
3. Identify and discuss the underlying concepts of IPv4 & IPv6 protocols, along with their characteristics and functionality.
4. Details of IP operations in the Internet and associated routing principles
5. Analyzing various layering protocols in computer networks.

PRE-REQUISITES:

1. Fundamentals of Computers and IT

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Utilize the fundamentals of data communication and networking to identify the topologies and connecting devices of networks.	BTL1 BTL2	PO1, PO2, PO3, PO7,PO8
CO2	Understand and describe the layered protocol model (OSI and TCP/IP model)	BTL2	PO1, PO2, PO3, PO7
CO3	Analyze the elements and protocols for peer – peer and communication between layers.	BTL3 BTL4	PO1, PO2, PO3, PO4, PO6, PO7
CO4	Evaluate and implement routing algorithms and Router basic configuration.	BTL3 BTL5	PO1, PO2, PO3, PO4, PO7, PO8
CO5	Evaluate the protocols and Principles in computer networking	BTL5 BTL6	PO1, PO2, PO3, PO4, PO5, PO6, PO7

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UNIT – I

No. of Hours: 10 Chapter/Book Reference: TB1[Chapter-1], TB2[Chapter-1, 2]

Basic Concepts: Components of data communication, distributed processing, Line configuration, topology, transmission mode, and categories of networks. **OSI and TCP/IP Models:** Layers and their functions, comparison of models. **Transmission Media:** Guided and unguided, Attenuation, distortion, noise, throughput, propagation speed and time, wavelength, Shannon Capacity.

UNIT – II

No. of Hours: 12 Chapter/Book Reference: TB1[Chapter-2, 3], TB2[Chapter-3, 9]

Telephony: Multiplexing, WDM, TDM, FDM, circuit switching, packet switching and message switching. **Data Link Layer:** Types of errors, Framing (character and bit stuffing), error detection & correction methods; Flow control; Protocols: Stop & wait ARQ, Go-Back- NARQ, Selective repeat ARQ.

UNIT – III

No. of Hours: 12 Chapter/Book Reference: TB1[Chapter-5], TB2[Chapter-18, 19, 20, 22]

Network Layer: Internetworking & Devices: Repeaters, Hubs, Bridges, Switches, Router, Gateway, Modems; Addressing: IPv4 and IPv6 addressing, IPv4 subnetting; Routing: Unicast Routing Protocols: RIP, OSPF, BGP;
Routing: Routing Methods- Static and Dynamic Routing, Routing basic commands, Distance vector protocol, Link state protocol

UNIT – IV

No. of Hours: 10 Chapter/Book Reference: TB1[Chapter-6,7], TB2[Chapter-23, 24,25]

Transport and upper layers in OSI Model: Transport layer functions and Protocols, connection management, functions of session layers, Presentation layer, and Application layer.

TEXT BOOKS:

TB1. A. S. Tenanbaum, "Computer Networks"; Pearson Education Asia, 4th Ed., 2003.
TB2. Behrouz A. Forouzan, "Data Communication and Networking", 2nd edition, Tata Mc Graw Hill.

REFERENCES:

RB1. D. E. Comer, "Internetworking with TCP/IP", Pearson Education Asia, 2001.
RB2. William Stallings, "Data and computer communications", Pearson education Asia, 7th Ed., 2002.
RB3. Leinwand, A., Pinsky, B. (2001). Cisco router configuration. United Kingdom: Cisco Press.

Bachelor of Computer Applications

Course Code: BCA 203 **L T C**
Course Name: Computer Organization and Architecture **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following:

1. To study the various logic gates and design principles of different digital electronic circuits
2. To design different combinational and sequential circuits.
3. Identify the functional units of the processor and the factors affecting the performance of a computer
4. To learn about the Input –Output organization of a typical computer

PRE-REQUISITES:

Fundamentals of Computer

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Able to understand the fundamentals of digital principles and able to design digital circuits by simplifying the Boolean functions	BTL2 BTL3 BTL5	PO1, PO7, PO11
CO2	Implement the combinational and sequential circuits for the given specifications	BTL3 BTL6 BTL1	PO1, PO4, PO7, PO11
CO3	Able to trace the execution sequence of an instruction through the processor	BTL1 BTL2	PO1, PO7, PO11
CO4	Demonstrate computer architecture concepts related to design of modern processors, memories and I/Os.	BTL2 BTL4	PO1, PO4, PO7, PO11
CO5	Demonstrate the ability to classify the addressing modes, instructions set	BTL2 BTL5	PO1, PO4, PO7, PO11

UNIT – I

No. of Hours: 11 Chapter/Book Reference: TB2[Chapter-2, 4], RB1 [Chapter-5, 6]

Boolean Algebra and Logic: Basics Laws of Boolean Algebra, Logic Gates, Simplifications of Boolean equations using K-maps SOP and POS, Don't Care condition.

Arithmetic Circuits: Adder, Subtractor, Parallel binary adder/Subtractor.

UNIT – II

No. of Hours: 11 Chapter/Book Reference: TB2 [Chapter-5, 6], RB1[Chapter-6,7]

Combinational Circuits: Multiplexers, De-Multiplexers, Decoders, Encoders.
Flip-flops: S-R, D, J-K, T, Clocked Flip-flop, Race around condition, Master slave Flip-Flop, Realisation of one flip-flop using other flip-flop, Applications of flip flop: Latch, Registers, Counters (elementary treatment to be given).

UNIT – III

No. of Hours: 11 Chapter/Book Reference: TB1[Chapter-5, 9], RB3[Chapter-11]

Data Transfer Operations: Register Transfer, Bus and Memory Transfer, Registers and micro-operations.
Basic Computer Organizations and Design: Instruction Codes, Computer Registers, Instruction Cycle, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes,

UNIT – IV

No. of Hours: 11 Chapter/Book Reference: TB1[Chapter-12, 13], RB3[Chapter-7]

Input-Output Organization: Peripheral Devices, Input-Output Interfaces, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA)
M**emory Organization:** Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory.

TEXT BOOKS:

TB1. Morris Mano, Computer System Architecture, 3rd Edition, Prentice-Hall of India Private Limited, 1999.
TB2. Moris Mano, "Digital Logic and Computer Design", PHI Publications, 2002

REFERENCES:

RB1. R. P. Jain, "Modern Digital Electronics", TMH, 3rd Edition, 2003.
RB2. WIliam Stallings, Computer Organization and Architecture, 4th Edition, Prentice Hall of India Private Limited, 2001
RB3. Subrata Ghosal," Computer Architecture and Organization", Pearson 2011
RB4. Malvino, "Digital Computer Electronics: An Introduction to Microcomputers", McGraw Hill

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Course Code: BCA 205 **L T C**
Course Name: Object Oriented Programming with C++ **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following:

1. Gain knowledge and develop a broad understanding of bottom up approach
2. Construct object oriented solutions for real world scenarios

PRE-REQUISITES:

1. Knowledge of C programming
2. Basic Programming Skills

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to: -

CO#	Detailed Statement of the CO	BT Level	Mapping to PO#
CO1	Understand the basic principles of Object-Oriented Programming	BTL2	PO2, PO3
CO2	Apply OOPs principles using C++ constructs	BTL3	PO3
CO3	Develop expertise in classification hierarchies and polymorphism using C++	BTL3	PO3, PO4
CO4	Comprehend the working of files and generic programming	BTL5	PO3, PO4

UNIT – I

No. of Hours: 10 Chapter/Book Reference: TB1 [Chapters 1, 2], TB2 [Chapters 1, 2, 3]

Object Oriented Paradigm: Procedural vs. object-oriented development, basic concepts of object-oriented programming, applications and benefits of OOP, comparison between C and C++.

Beginning with C++: Stream based I/O, literals- constant qualifiers, operators in C++, reference variable, functions, default arguments, parameter passing by value, reference and pointer, inline functions, type conversion, basic C++ programs, new, delete operators- basic use and dynamic memory allocation for arrays.

UNIT – II

No. of Hours: 11 Chapter/Book Reference: TB1 [Chapters 10, 11], TB2 [Chapters 5, 6]

Classes and Objects: C++ class declaration, access specifiers, member functions, arrays within a class, array of objects, memory allocation of objects, passing objects as arguments, returning objects from functions, function overloading, static data and member functions, friend function and friend class, this pointer

Constructors & Destructors: Introduction to constructor and destructor, parameterized constructor, constructor with default arguments, multiple constructors in a class, copy constructor.

UNIT – III

No. of Hours: 12 Chapter/Book Reference: TB1 [Chapters 13, 14, 15], TB2 [Chapters 7, 8, 9]

Inheritance: Types of inheritance, derivation – public, private & protected, ambiguity resolution (function overriding), aggregation, composition v/s classification, virtual base class, constructor and destructor in derived classes.
Polymorphism: Types of polymorphism, early v/s late binding, **Virtual Functions**: Need for virtual functions, pointer to derived class objects, pure virtual functions, abstract classes.
Operator Overloading: Overloading unary operators, nameless objects, overloading binary operators, overloading with friend functions, conversion between basic types and user-defined types.

UNIT – IV

No. of Hours: 11 Chapter/Book Reference: TB1 [Chapters 16, 17, 18, 19], TB2 [Chapters 11, 12, 13]

Parametric polymorphism: Generic Programming with Templates, Introduction, function templates/generic functions, characteristics, overloading of template functions, class templates, template arguments.
Exception Handling: Exception-handling model, types of exception, catching and handling exceptions, generic catch, rethrowing an exception, specifying exceptions for a function.
Streams & Files: C++ Streams, basic stream classes, C++ predefined streams, I/O operations, unformatted console I/O operations, manipulators, opening and closing a file- different modes and methods, error handling during file operations, file pointers and their manipulations, sequential access to file, random input and output operations, persistent objects, command line arguments.

TEXT BOOKS:

TB1. K.R. Venugopal, Rajkumar, T. Ravishanker, “Mastering C++”, TMH
TB2. E. Balagurusamy, “Object Oriented Programming with C++”, McGraw-Hill Education

REFERENCE BOOKS:

RB1. Ashok N. Kamthane, “Object-Oriented Programming with ANSI And Turbo C++”, Pearson Education.
RB2. Schildt Herbert, “C++: The Complete Reference”, Tata McGraw Hill.
RB3. R. Lafore, “Object Oriented Programming using C++”, Galgotia Publications.

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Course Code: BCA 207 **L T/P C**
Course Name: Human Values and Ethics **2 0 2**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course andprepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following:

1. To distinguish between values and skills, and understand the significance of values in personal and professional life
2. To understand harmony at all the levels of human living, and live accordingly.
3. To understand the role of a human being in ensuring harmony in society and nature.
4. To apply the understanding of harmony in existence in their profession and lead an ethical life

PRE-REQUISITES:

None

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Identify and evaluate personal ethical values and their implications in various social situations	BTL1	PO10
CO2	Recognize the multiple ethical interests at stake in a real-world situation	BTL2	PO10
CO3	Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research	BTL3	PO10
CO4	Instill Moral and Social Values and Loyalty and appreciate the rights of others	BTL4	PO10
CO5	Comprehend the concept of harmony at all the levels of society and readiness to contribute towards harmony at all levels.	BTL5	PO10

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UNIT – I

No. of Hours: 10 Chapter/Book Reference: TB1 [Chapters-1, 2], TB2 [Chapters-1]

Introduction to human values:

- Understanding the need, basic guidelines, process of value education
- Understanding the thought provoking issues- continuous happiness and prosperity
- Right understanding- relationship and physical facilities, choice making- choosing, cherishing and Acting
- Understanding values- Personal Values, Social values, Moral values and spiritual values, Self-Exploration and Awareness leading to Self-Satisfaction; Tools for Self-Exploration.

UNIT-II

No. of Hours: 10 Chapter/Book Reference: TB2 [Chapters 5-10]

Harmony and role of values in family, society and human relations

- Understanding harmony in the Family- the basic unit of human interaction; Understanding values in human-human relationship; Understanding harmony in the society-human relations.
- Interconnectedness and mutual fulfilment; Coexistence in nature.
- Holistic perception of harmony at all levels of existence-universal harmonious order in society. Visualizing a universal harmonium order in society- undivided society (Akhand Samaj), universal order (Sarvabhaum Vyawastha)- from family to world family.

UNIT-III

No. of Hours: 11 Chapter/Book Reference: TB1 [Chapters-2, 3]

Coexistence and role of Indian Ethos:

- Interconnectedness and mutual fulfilment among the four orders of nature-recyclability and self-regulation in nature
- Ethos of Vedanta; Application of Indian Ethos in organizations in management; Relevance of Ethics and Values in organizations in current times.

UNIT-IV

No. of Hours: 11 Chapter/Book Reference: TB1 [Chapters-4, 5], TB2 [Chapters-12, 13]

Professional ethics

- Understanding about Professional Integrity, respect and equality, Privacy, Building Trusting relationships, Co-operation, respecting the competence of other profession.
- Understanding about taking initiative, promoting the culture of openness, depicting loyalty towards goals and objectives.
- Ethics at the workplace: - cybercrime, plagiarism, sexual misconduct, fraudulent use of institutional resources, etc.;
  Ability to utilize the professional competence for augmenting universal human order.

TEXT BOOKS:

TB1. A Textbook on Professional Ethics and Human Values by R S Naagarazan.

TB2. A Foundation Course in Human Values and Professional Ethics by R.R. Gaur, R. Sangal, G.P. Bagaria.

TB3. Indian Ethos and Modern Management by B L Bajpai New Royal Book Co., Lucknow., 2004, Reprinted 2008.

REFERENCE BOOKS:

RB1. A N Tripathy, 2003, Human Values, New Age International Publishers

RB2. Human Values and Professional Ethics by Vaishali R Khosla, Kavita Bhagat

RB3. I.C. Sharma. Ethical Philosophy of India Nagin & co Julundhar

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Course Code: BCA 211 **L T/P C**
Course Name: Basics of Python Programming **4 1 5**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes(CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy(BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following: -

1. To understand Python programming fundamentals
2. To define the structure and components of a Python program.
3. To apply fundamental problem-solving techniques using Python
4. To design and program applications using Python.

PRE-REQUISITES:

1. **Computer Fundamentals**

COURSE OUTCOMES(COs):

After completion of this course, the learners will be able to: -

CO#	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Demonstrate knowledge of basic programming constructs in python.	BTL2	PO1, PO2, PO3,PO7
CO2	Illustrates string handling methods and user-defined functions in python	BTL3	PO1, PO2, PO3,PO7, PO10
CO3	Applying data structures primitives like List, Dictionary and tuples.	BTL2	PO1, PO2, PO3,PO4
CO4	Identify the commonly used operations involved in file handling	BTL3	PO1, PO2, PO3, PO4, PO7
CO5	To understand how python can be used for application development	BTL2	PO1, PO2, PO3, PO4, PO11

UNIT–I

No. of Hours: 11 Chapter/Book Reference: TB1[Chapters 1, 2], TB2[Chapters 1, 3, 6]

Basic Introduction: Origin, Need of Python Programming, Features, program structure, identifiers, reserved words, escape sequences, IDLE-Python Interpreter

Python Programming Introduction: Variables and assignment statements, data types, **Operators**: Assignment, Unary, Binary, Arithmetic, Relational, Logical, Bitwise Operator and membership operator

Control Structures: if-conditional statements, if –else condition, if-elif-else condition, nested if-elif-else condition, Iteration (for Loop and while loop), Nested Loops, break and continue statement.

Strings: Slicing, Membership, Built in functions (count, find, capitalize, title, lower, upper and swap case, replace, join, isspace (), isdigit(), split(), startswith(), endswith()).

UNIT–II

No. of Hours: 11 Chapter/Book Reference: TB1[Chapter 3], TB2[Chapters 7, 12]

Mutable and Immutable objects:
List: creating, initializing, accessing, slicing, and traversing List. List operations: length, concatenation, repetition, in, not in, max, min, sum, all, any. List methods: append, extend, count, remove, index, pop, insert, sort, reverse.
Tuples: creating tuples, Tuple operations: length, concatenation, repetition, membership, maximum, minimum, tuple methods: count, index.
Dictionary: creating, accessing values, adding, modifying and deleting items in dictionary, Dictionary methods: len, str, clear, copy, get, update, copy. Difference between list and dictionary

UNIT–III

No. of Hours: 11 Chapter/Book Reference: TB1 [Chapters 5], TB2[Chapters 2, 8]

Concept of Functions: Functions: Defining, Calling and Types of Functions, Arguments and Return Values, Formal vs. Actual Arguments, Scope and Lifetime, Keyword Arguments, Default Arguments, Recursion.
Modules: importing Modules, Math and Random Module, creating your own modules, and concept of Packages

UNIT–IV

No. of Hours: 11 Chapter/Book Reference: TB2[Chapter 9], TB1[Chapters 5, 7]

NumPy Library: introduction to NumPy, Creation of One-Dimensional Arrays, Re-shaping of an Array, Element-wise Operations, Aggregate Operations, Array indexing, Array Slicing, insert Row/Columns, Append Row/Columns, Array Manipulation Operations, Multi-Dimensional Arrays.
File handling: Types of Files (Text file, Binary Files, CSV file), Creation, writing, appending, Insertion, deletion, updating, modification of Data in into the files.

TEXTBOOKS:

TB1. Programming in Python 3: A Complete Introduction to the Python Language (2nd Edition), Mark Summerfield.
TB2. Python Programming: A Modular Approach by Taneja Sheetal, Kumar Naveen, Eleventh Impression, Pearson India Education Services Pvt. Ltd.
TB3. Agile tools for real world data: Python for Data Analysis by Wes McKinney, O'Reilly

REFERENCE BOOKS:

RB1. Let Us Python 2Nd Ed: Python Is Future, Embrace It Fast (Second Edition): Yashvant Kanetkar.
RB2. Programming Python, 4th Edition by Mark Lutz Released December 2010 Publisher(s): O'Reilly Media, Inc.
RB3. Python: The Complete Reference by Martin Brown.

List of Practicals

S.No.	Problem Statement	Mapping to CO #
Implement Minimum 10 out of 15 Practicals		
1	Write a program to enter two integers, two floating numbers and then perform all arithmetic operations on them.	CO1
2	Write a program to check whether a number is an Armstrong number or not.	CO1

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3	Write a program to print the sum of all the primes between two ranges.	CO1
4	Write a program to swap two strings.	CO1
5	Write a menu driven program to accept two strings from the user and perform the various functions using user defined functions.	CO1, CO2
6	Write a program to find smallest and largest number in a list	CO2, CO3
7	Create a dictionary whose keys are month names and whose values are the number of days in the corresponding months. • Ask the user to enter a month name and use the dictionary to tell them how many days are in the month. • Print out all keys in the alphabetically order • Print out all the months with 31 days • Print out the key value pairs sorted by number of days in each month	CO2, CO3
8	Make a list of first 10 letters of the alphabet, then use the slicing to do the following operations: • Print the first 3 letters of the list • Print any 3 letters from the middle Print the letter from any particular index to the end of the list	CO2, CO3
9	Write a program that scans an email address and forms a tuple of user name and domain.	CO2, CO3
10	Write a program that uses a user defined function that accepts name and gender (as M for Male, F for Female) and prefixes Mr./Ms. on the basis of the gender.	CO2, CO3
11	Write a program to print the Fibonacci series using recursion	CO2, CO3
12	Write a program that defines a function large in a module which will be used to find larger of two values and called from code in another module	CO2, CO3
13	Write a program to know the cursor position and print the text according to specifications given below: ● Print the initial position ● Move the cursor to 4th position ● Display next 5 characters ● Move the cursor to the next 10 characters ● Print the current cursor position ● Print next 10 characters from the current cursor position	CO2, CO3
14	Create a binary file with roll number, name and marks. Input a roll number and perform the following operations: • update the marks. • Delete the record • Display the record • Append the record • Search the record	CO4
15	Write a program to Create a CSV file by entering user-id and password, read and search the password for given user id	CO5
Note: **1. In total 10 practicals to be implemented.** **2. This is a suggestive list of practicals. However, the instructor may add or change any other database for executing queries as per the requirement.**		

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Course Code: BCA 213 **L T/P C**
Course Name: Cyber Security **4 1 5**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes(CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy(BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following: -

1. Students will be able to understand and learn the concept, layers of Cyber Security.
2. Students will be able to learn about cybercrime and types of attack.
3. Students will be able to learn about how many tools and methods available of cybercrime.
4. To study about cybercrime real life examples and cases.
5. Students will be able to understand and learn about Ethical Hacking.
6. Students will be able to understand and learn about Cyber Forensics.

PRE-REQUISITES:

1. Fundamentals of Information Technology

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Define the basic concept of Cyber Security, Cybercrime and Cybercriminals. Identify and understand about Cyber Threats.	BTL1 BTL2	PO1,PO2,PO3, PO7
CO2	Describe briefly types of criminal attack and classification of Cybercrimes. Describe Steganography.	BTL2	PO1,PO3, PO7
CO3	Identify and apply the Cybercrime Tools and Methods. Identify and apply the underlying concepts of Symmetric-key and Asymmetric-key Cryptography along with Digital Signature.	BTL1, BTL2, BTL3	PO1,PO3,PO6, PO8
CO4	Implement security for HTTP applications, Emails. Apply Firewall in your system.	BTL4	PO1,PO3,PO5, PO7
CO5	Implement, evaluate Keyloggers. Implement and evaluate different cyber security algorithms with the help of program.	BTL3, BTL5	PO1, PO4, PO6, PO7, PO8
CO6	Design and create security mechanisms to protect computer systems.	BTL6	PO1, PO4, PO6, PO7, PO8

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UNIT – I

No. of Hours: 12 Chapter/Book Reference: TB1 [Chapters – 1, 2], TB2[Chapters - 1, 2]

Introduction to Cyber Security: Basic Cyber Security Concepts, Layers of Cyber Security, Cybercrimes, Cybercriminals, Cyberspace, Cyber threats, Cyberwarfare, Classification of Cybercrimes, Categories of Cyber Crime, Types of criminal attack, cyberstalking, botnet, cybercrime and cloud computing.

UNIT – II

No. of Hours: 10 Chapter/Book Reference: TB1 [Chapters – 2, 3], TB2 [Chapter - 3, 4, 11]

Cybercrime attacks on Mobile/Cell Phones, Introduction to Cybercrime Tools and Methods: phishing and its working, password cracking and its types, Keyloggers and its types, viruses, Trojan horse and backdoor, steganography, DoS & DDoS attack,

UNIT – III

No. of Hours: 10 Chapter/Book Reference: TB1 [Chapter – 4], TB3 [Chapter - 2, 21]

Cryptography: Introduction to Cryptography, Symmetric-key Cryptography, Asymmetric-key Cryptography, User Authentication, Password Authentication, Message Authentication, Digital Signature.

Securing Web Application, Services: Introduction, Basic security for HTTP Applications, Email Security, Backup issues, Identity Management and Web Services, Authorization Patterns, Firewall

UNIT – IV

No. of Hours: 12 Chapter/Book Reference: TB1 [Chapter – 6], TB2 [Chapter - 7]

Introduction to Cyber Forensics: Need of Cyber Forensics, Digital Evidence and its rules, RFC2822, Life cycle of Digital Forensics, process of Digital Forensics, Phases of Computer Forensics/Digital Forensics, Computer Forensics Investigation, Computer Forensics and Steganography, OSI 7-layer model to Computer Forensics.

TEXT BOOKS:

TB1. Supriya Madan and Rajan Gupta, "Security in Cyber Space and its Legal Perspective", 1st Edition, AGPH Books.

TB2. Nina Godbole and Sunit Belpure, Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley.

TB3. Kevin Beaver, Hacking for Dummies Wiley Publishing, Inc.

TB4. Stallings and Brown, Computer Security: Principles and Practice, Fourth Edition, Publisher: Pearson, 2018.

REFERENCE BOOKS:

RB1. Cyber Security Essentials, James Graham, Richard Howar and Ryan Otson, CRC Press.

RB2. Introduction to Cyber Security: Jeetendra Pande.

RB3. Certified Ethical Hacker STUDY GUIDE Kimberly Graves Sybex.

List of Practicals

S.No.	Problem Statement	Mapping to CO #
1	Install and configure any Antivirus software on System	CO1

2	Implement prevention mechanisms to protect PC from Cyber Attack	CO1
3	Implement Steganography Algorithms	CO2
4	Implement and install the keyloggers to understand their working.	CO5
5	Implement hiding of Data in image using tools.	CO3
6	Apply security to Files/ Folder/ Application using access permissions	CO4
7	Study of System threat attacks - Denial of Services.	CO4
8	Study of Techniques uses for Web Based Password Capturing.	CO5
9	Study of Anti-Intrusion Technique – Honey pot.	CO6
10	Study of Sniffing and Spoofing attacks.	CO6

Note:
1. In total 10 practicals to be implemented.
2. This is a suggestive list of practicals. However, the instructor may add or change any other database for executing queries as per the requirement.

Bachelor of Computer Applications

Course Code: BCA 221 **L T C**
Course Name: Principles of Management & Organizational Behaviour **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes(CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy(BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following:

1. To get the knowledge about the important management concepts and their applications.
2. To help the students to develop cognizance of the importance of management principles.
3. To have an insight of various functional departments in an organization.
4. To help the organization in understanding Organizational culture.

PRE-REQUISITES:

None

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Develop basic knowledge about management, management process, managerial roles, skills and functions and management theories.	BTL2,1	PO1, PO2
CO2	To give knowledge about planning and decision making process. To describe about staffing and directing.	BTL2,4	PO2, PO1
CO3	To learn about the motivation theories and Leadership styles. To discuss about the Organizational behaviour and its application.	BTL4,6	PO3
CO4	To give basic knowledge people management, their personality and perception. To describe about the Organisational culture and its effects.	BTL5,2	PO3

UNIT – I

No. of Hours: 12 Chapter/Book Reference: TB1 [Chapters – 1, 2, 4]

Management: Meaning & concept, Management principles (Fayol & Taylor), Management process (in brief), Managerial levels, Skills, Roles and Functions of a manager, Management Theories (Classical, Neo classical, Behavioral, Systems & Contingency).

UNIT – II

No. of Hours: 10 Chapter/Book Reference: TB1 [Chapters – 7, 8, 10, 16, 17, 27, 28]

Planning: Meaning, Purpose & process, Decision making: Concept & process, Organizing: Process, Departmentation, Authority & Responsibility relationships, Decentralization.

Staffing: Concept, nature & importance of staffing and Directing.

UNIT – III

No. of Hours: 12 Chapter/Book Reference: TB1 [Chapters – 13, 18, 32, 33]

Motivation: concept & theories (Maslow's, Herzberg Two factor, McGregor's theory X & Y), Leadership: Concepts & styles. Controlling: Nature, Importance, significance & Process of control.

Organizational Behavior: concept and Nature of Organisational Behaviour, Importance, Challenges and Opportunities. Organizational culture: Meaning, importance and characteristics of organization culture.

UNIT – IV

No. of Hours: 10 Chapter/Book Reference: TB1 [Chapters –34, 35, 36, 40, 41]

Managing People - Meaning, Need of understanding human behavior in organization, Models of OB, Major concepts in OB (elementary) - Personality, Learning, concept of perception & perception theories, Attitude Building and Leadership.

TEXT BOOKS:

TB1. Dr. C.B Gupta "Management concepts & practices" S.Chand & Sons, 2009.

REFERENCES BOOKS:

RB. Stoner, Freeman & Gilbert, "Management" 6th Edition, Pearson International.
RB2. Ankur Chhabra, "Organisational Behaviour", Sun India Publications, 2009
RB3. Robbins, Stephen P, "Organisational Behaviour". PHI, 2010

Bachelor of Computer Applications

Course Code: BCA 233 **L T/P C**
Course Name: Designing Lab CorelDraw **0 4 2**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes(CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy(BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following: -

1. Introduction to graphics designing.
2. Knowledge & hands-on on CorelDraw.

PRE-REQUISITES:

None

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Explain the basics of graphics designing & CorelDraw suite.	BTL1	PO1, PO6
CO2	Exploring the vector & 3D tools in CorelDraw.	BTL3 BTL5	PO1, PO6
CO3	Exploring the custom shapes & basics of printing in CorelDraw.	BTL3 BTL5	PO1, PO6
CO4	Exploring the workspaces & objects in CorelDraw.	BTL3 BTL5	PO1, PO6

UNIT – I

Introduction to graphic designing, Input/Output Technologies, Color Coding: RGB, CMYK, Grayscale, Bitmap, Color Channel, Resolution, Printing Templates, Rastar Images, Vector Images, Measurement Units & Conversion, Introduction to CorelDraw.

UNIT – II

Introduction to Layers and Groups, Color Picker & Gradients, Status bar, Toolbar, Menu bar, Property bar, Shapes & Shape Tools, Pick & Transform Tools, 3-D Effects: Shadow, Bevel Effects, Extrusion Effects, Perspective Effects, Text Formatting, Colors Styles & Palette, Alignment Controls.

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UNIT – III

Blend Modes, Creating Custom Shapes, Shape Recognition Tool, Brush, Outline & Line Tools, Importing Images in CorelDraw, Transform Controls, Basics of Printing.

UNIT – IV

Generating Barcode & QR Code, Calendar, Web Objects, Workspace Customization, Importing/Exporting Objects, Quick Trace, Manual Image Tracing.

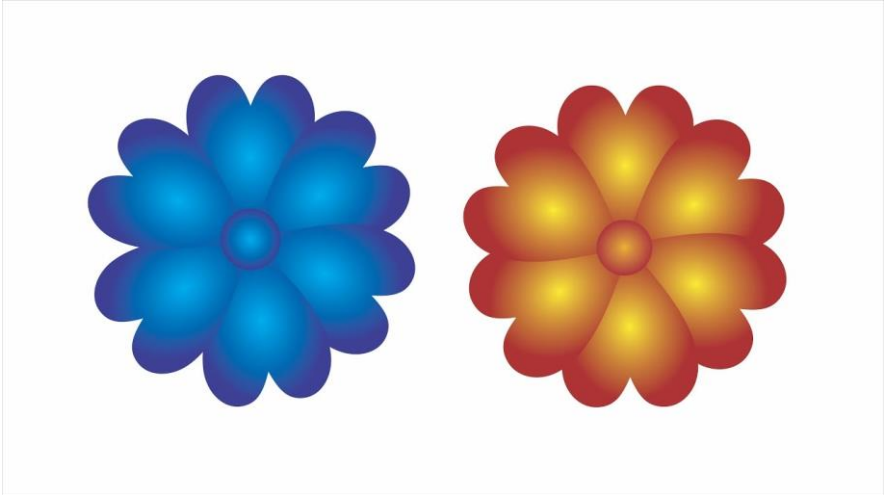
TEXT BOOKS:

TB1. Gary David Bouton, "CorelDRAW X7: The Official Guide", Corel Press.
TB2. DT Editorial Services (Author), "CorelDRAW 2018 in Simple Steps", Dreamtech Press.

REFERENCE BOOKS:

RB1. Prof. Satish Jain, M. Geetha, "CorelDRAW Training Guide", BPB Publication.
RB2. Deke McClelland, "CorelDRAW! 7 For Dummies", Hungry Minds Inc,U.S.
RB3. Roger Wambolt, "Bring It Home with CorelDRAW: A Guide to In-House Graphic Design", Delmar Cengage Learning.

List of Practicals

S. No.	Detailed Statement	Mapping to CO #
Core Practicals (Implement minimum 8 out of 10 practicals)		
1.	Create a file to demonstrate the use of layers, groups.	CO2
2.	Create a photo frame in CorelDraw.	CO2, CO3
3.	Take an image of basic shape (square, triangle, circle, rectangle and parallelogram) in CorelDraw & extract these shapes from the image to different layers.	CO2
4.	Create a QR Code in CorelDraw.	CO4
5.	Create a flower in CorelDraw with gradient. **Sample Output Image:** 	CO2, CO3

6.	Create a visiting card for yourself in CorelDraw. (size=3.5 x 2 inch., color coding: CMYK)	CO1, CO2, CO3
7.	Create a Tri-Fold Brochure in CorelDraw for Tours & Travels Company.	CO1, CO2, CO3
8.	Create a border design in CorelDraw.	CO2, CO3
9.	Create basic shapes (square, triangle, circle, rectangle and parallelogram) in CorelDraw shape tools.	CO2, CO3
10.	Trace an image of some cartoon character in CorelDraw. (Do not use Quick Trace feature of CorelDraw)	CO4
Application Based Practicals (Implement Any one out of the following suggestive list)		
11.	Create a digital invitation card in CorelDraw Format. (size=A8 or A4, color coding: RGB)	CO1, CO2, CO3, CO4
12.	Create a banner for a college event in CorelDraw. (Size: A3, Color Code: CMYK)	CO1, CO2, CO3, CO4
13.	Create a Calendar for the current year in Corel Draw.	CO4
14.	Create a Book cover in CorelDraw.	CO1, CO4
15.	Create a Birthday Wishing card in CorelDraw (size=A8 or A4, color coding: RGB)	CO1, CO2, CO3, CO4

Note:
1. In total 10 practicals to be implemented. 2 additional practicals may be given by the course instructor.
2. This is a suggestive list of programs. However, the instructor may add programs as per the requirement of the course.

Bachelor of Computer Applications

Course Code: BCA 235 **L T/P C**
Course Name: ASP.NET **0 4 2**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes(CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy(BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:

The objective of this course is to provide the learners:

1. Basic knowledge of ASP.NET Framework
2. Understand the basic and advanced ASP.NET Web Controls
3. Gain expertise in developing ASP.NET Web Applications

PRE-REQUISITES:

Prior knowledge of HTML, JavaScript and CSS concepts would help in better grasping of the subject

COURSE OUTCOMES (COs):

After the completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping of PO#
CO1	Understand the designing and development of Web Application Components	BT2	PO2
CO2	Develop dynamic web pages using Web Server controls	BT4	PO4, PO5
CO3	Design and create web applications with Validation controls	BT3	PO6, PO7, PO8
CO4	Understand and Apply database connectivity to Web Applications	BT5	PO3

UNIT I

.NET Framework: Understand the .NET Platform, Components of .NET Framework: CLI, CTS, CLS, CLR and CLI. Understand the Assembly in .NET Framework.

UNIT II

Working with ASP.NET Forms: Building ASP.NET Page, Building Forms with Web Server Controls, Performing Form Validation and Validation Control, Advanced Control Programming

UNIT III

Working with ASP.NET Applications: Creating ASP.NET Application, Tracking User Sessions, Caching ASP.NET Application, Error Handling, Authentication and Authorization.

UNIT IV

Working with ADO.NET: Introduction to ADO.NET, Working with Data-Bound Controls, Working with Datasets

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TEXT BOOKS:

TB1. Jason N. Gaylord, Christian Wenz, Pranav Rastogy, Todd Miranda, Scott Hanselman, "Professional ASP.NET 4.5 in C# and VB", Wrox Publication, Ist Edition, 2013
TB2. Stephen Walther, Kevin Hoffman, Nate Dudek, "ASP.NET 4.0 Unleashed", Pearson Education, Ist Edition 2010
TB3. Achyut S Godbole and Atul Kahate, "Web Technologies", Tata McGraw Hill
TB4. Malt. J. Crouch, "ASP.NET and VB.NET Web Programming", Pearson, 2002.

REFERENCE BOOKS:

RB1. T.M. Ramachandran, "Internet & Web Development", Dhruv
RB2. Kathleen Kalata, "Web Application using ASP.NET 2.0", 2nd Edition, 2009
RB3. K.K Sharma, "Web Technologies", A.B. Publication Delhi, First Edition, 2008
RB4. Jess Chadwick, Todd Snyder, Hrusikesh Panda, "Programming ASP.NET MVC 4", O'Reilly Media, Ist Edition, 2012

List of Practicals

S. No	Detailed Statement	Mapping of CO #
1	Create a simple Web Page showing the use of basic Web Controls of ASP.NET	CO1
2	Create a Web Page showing the integration of multiple forms in ASP.NET	CO1
3	Create a basic student registration form in ASP.NET	CO1, CO2
4	Create a Web Form to display all the validation controls of ASP.NET	CO2
5	Create a Cookie and set its expiry date. Demonstrate its application on Web form	CO3
6	Manage the state of a web form at global level and configure the states at application level	CO3
7	Apply the form-based authentication technique on web form in ASP.NET	CO2, CO3
8	Demonstrate a calendar control and a imagemap control on a Web Form	CO1
9	Create a web form to store the students' data in the database	CO4
10	Create a Web application for a Pizza Delivery using ASP.NET components	CO2, CO3, CO4

Note:
1. In total 10 practicals to be implemented. 2 additional practicals may be given by the course instructor.
2. This is a suggestive list of programs. However, the instructor may add programs as per the requirement of the course.

Bachelor of Computer Applications

Course Code: BCA 237 **L T/P C**

Course Name: AR VR Development with Unity **0 4 2**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together,

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to

1. Augmented and virtual reality development
2. Games and application development using Unity engine

PRE-REQUISITES:

Basic Programming Skills

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Familiarize the basics of augmented, virtual and mixed reality.	BTL2	PO1, PO2, PO3, PO4
CO2	Understand and apply the game development basics.	BTL3	PO1, PO2, PO3, PO4, PO5
CO3	Compare and implement the various XR development techniques.	BTL5	PO1, PO2, PO3, PO4,PO5
CO4	Appraise the XR development using Unity Engine.	BTL5	PO1, PO2, PO3, PO4, PO5

UNIT-I

Chapter/Book Reference: TB1 [Chapters - 1, 2, 9, 10], TB2 [Chapter - 1], TB3 [Chapters 1 - 5]

VR and AR Introduction

Virtual Reality: VR Devices, Optics of VR, Mobile, Tethered and Standalone, Tracking, VR Design Principles

Augmented Reality: Types of AR, Architecture of AR systems, AR Software Development Kits, AR Devices

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UNIT-II

Chapter/Book Reference: TB1 [Chapters - 1, 2, 9, 10], TB2 [Chapter - 1], TB3 [Chapters 1 - 5]

Unity Introduction: Setting up Unity, Unity Hub, Managing different versions of Unity
Unity Interface: Interface Overview, Scene View, Game View, Hierarchy Window, Project Window, Inspector Window, Asset Store, GameObject

UNIT-III

Chapter/Book Reference: TB3 [Chapters - 11, 15, 18], TB4 [Chapters - 1, 2, 8, 10]

Unity Physics Engine: Rigidbody, Force Modes, Raycasting, Collisions and Triggers, Physics Joints, Collision Physics

UNIT-III

Chapter/Book Reference: TB3 [Chapters – 13 to 17]

Scripting in Unity: Order of Execution (Monobehavior), Defining Motion, Transform and Vector3, Rigidbody, Changing camera position, Attaching a camera to moving game object, User input, Prefabs- Spawn Manager, Destroy Feature

UNIT-IV

Chapter/Book Reference: TB1 [Chapter - 8], TB2 [Chapters- 3-9,10-12,16-17], TB3 [Chapters - 7-10, 12]

VR Development: Setting Up, Different Controls (Gaze based, Controller based), World Space UI, Locomotion, Build and Run, VR Storytelling.
AR Development: Setting Up, GIS Fundamentals, Sensor Data and plugins, AR Interaction, Plane Detection, HoloLens.
Effects and Animations
Introduction: Importance of animations, and Animator Controllers.
Player's animation setup: Start off at a run, jump animation, falling animation and unconscious jumping, Animator and Animations.
Particle Effects: Customize an explosion particle, Play the particle on collision.
Sound Effects: Add background music and Add audio clips on events.

TEXTBOOKS:

TB1: William R. Sherman, Alan B. Craig "Understanding Virtual Reality", Science Direct, Second Edition, 2018.
TB2. Jesse Glover, Jonathan Linowes "Complete Virtual Reality and Augmented Reality Development with Unity", Packt, 2019.
TB3. Nicolas Alejandro Borromeo, "Hands-On Unity 2020 Game Development", Packt, 2020.
TB4. David Aversa, Aung Kyaw "Unity Artificial Intelligence Programming", Packt, Fourth Edition, 2018.

E-Resources:

E1. https://learn.unity.com/

List of Practicals

S. No	Detailed Statement	Mapping of Co #
1.	Installation of Unity Software	CO1,CO4
	Creating Sprites	

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1	Setting up a basic mini-project in which users can control the side-to-side movement of an object to avoid colliding with obstacles with camera and movement Features, clean code, hierarchy and assets folder	CO1,CO2, CO3,CO4
2	Setting up a top-down game with the objective of throwing food to hungry animals stampeding towards the player, before they can run through implementation of gameplay, prefabs and collision.	CO1,CO2, CO3,CO4
3	Setting up a game to test the player's reflexes, where the goal is to click and destroy objects randomly tossed in the air before they can fall off the screen through implementation of animations, sound effects.	CO1,CO2, CO3,CO4

Bachelor of Computer Applications

Course Code: BCA-239	**L**	**T/P**	**C**
Course Name: Cyber Ethics	**0**	**4**	**2**

New Subject proposed subject to approval of BOS

INSTRUCTIONS TO PAPER SETTERS:

4. Question No. 1 should be compulsory and cover the entire syllabus. There should be10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
5. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
6. Examiners are requested to go through the Course Outcomes(CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy(BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following: -

3. Students will be introduced to the widespread development of cyber ethics.
4. Students will learn about impacting issues,laws, and developments that will help shape their future within the business community through technology
5. To facilitate students to grow and develop professionally and morally through readings, class participation, and course activities.

PRE-REQUISITES:

None

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to: -

CO #	**Detailed Statement of the CO**	**BT Level**	**Mapping to PO #**
CO1	Define cyber ethics and recognize cyber ethic issues	BTL1	PO10
CO2	Identify how security issues in cyberspace raise ethical concerns.	BTL3 BTL5	PO10
CO3	Recognize various types of cybercrime and its impact	BTL3 BTL5	PO10
CO4	Discuss ethical issues associated with the use of social networks and social media	BTL3 BTL5	PO10
CO5	Survey recent whistle-blowing cases focusing on associated ethical issues		PO10

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UNIT – I

No. of Hours: 05 Chapter/Book Reference: TB1 [Chapters – 1, 2,3]

Emergence of cyber space. Cyber Jurisprudence, Cyber Ethics, Ethics for IT Workers and IT Users, Cyber Jurisdiction, Hierarchy of courts, Civil and criminal jurisdictions The Importance of Cyber Law, Significance of cyber Ethics, Need for Cyber regulations and Ethics.

UNIT – II

No. of Hours: 05 Chapter/Book Reference: TB1 [Chapters – 1, 2,3]

Cyberspace-Web space, Web hosting and web Development agreement, Legal and Technological Significance of domain Names, Internet as a tool for global access. Cyberattacks and Cybersecurity, Privacy Issues

UNIT – III

No. of Hours: 05 Chapter/Book Reference: TB1 [Chapters – 4,5,6]

Freedom of Expression, Intellectual Property Issues, Ethical Decisions in Software Development, Social Media Ethical issues

Ethical Issues in AI and core Principles, Introduction to Block chain Ethics.

UNIT – IV

No. of Hours: 08 Chapter/Book Reference: TB1 / Online articles / News and legal case

Discussion on articles, companies, or legal cases that deal with an ethical issue. Students are required to analyze and present at least one multinational company and investigate its ethical policies and practices. These polices can normally be found using any search engine.

TEXT BOOKS:

TB1. Cyber Ethics 4.0 Serving Humanity with Values Editors Christoph Stückelberger / Pavan Duggal e-book by Globalethics.net available for download from https://repository.globethics.net/handle/20.500.12424/169317)

REFERENCE BOOKS:

The students may refer free e-books or latest articles, news and legal cases dealing ethical issues for understanding the importance of cyber ethics.

Bachelor of Computer Applications

Course Code: BCA 271 **L T/P C**
Course Name: Practical – VII C++ Lab **0 4 2**

LEARNING OBJECTIVES:
In this course, the learners will be able to:
1. Develop concepts related to Object Oriented Programming
2. Construct object oriented solutions in real world scenarios

PRE-REQUISITES:
1. Knowledge of C programming
2. Basics of Programming

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Implement basic concepts of Object Oriented Programming	BTL 3	PO3
CO2	Implement the concept of Classes and Objects	BTL 3	PO2
CO3	Analyse and apply various polymorphism techniques to solve real life problems	BTL 4	PO2, PO4
CO4	Implement Generic Classes, Exception Handling and various file operations	BTL 4	PO4

List of Practicals		
S. No.	**Detailed Statement**	**Mapping to CO #**
Core Practicals (Implement minimum 8 out of 10 practicals)		
1	WAP to implement '*Inline function'*	CO1
2	WAP to implement call by reference and return by reference using class. [Hint. Assume necessary functions]	CO1
3	WAP to implement friend function by taking some real life example	CO2
4	WAP to implement '*Function Overloading'*	CO3
5	WAP to implement *Parameterized Constructor, Copy Constructor* and *Destructor*	CO2
6	WAP to show the usage of constructor in base and derived classes, in multiple inheritance	CO3
7	WAP to show the implementation of '*containership'*	CO3
8	WAP to show swapping using template function (Generic)	CO4
9	WAP to implement '*Exception Handling*'	CO4
10	WAP to read and write values through object using file handling	CO4

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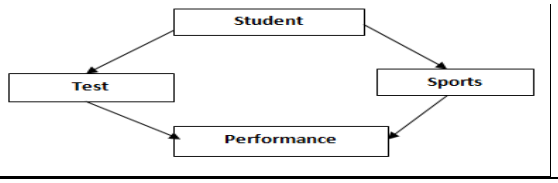
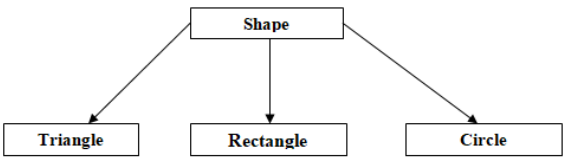
Application Based Practicals (Implement minimum 5 out of 10 practicals)		
11	Create a class employee which have name, age and address of employee, include functions getdata() and showdata(), getdata() takes the input from the user, showdata() display the data in following format: *Name:* *Age:* *Address:*	CO2
12	Write a class called **CAccount** which contains two private data elements, an integer **accountNumber** and a floating point **accountBalance,** and three member functions: • A constructor that allows the user to set initial values for **accountNumber** and **accountBalance** and a default constructor that prompts for the input of the values for the above data numbers. • A function called **inputTransaction**, which reads a character value for **transactionType**('D' for deposit and 'W' for withdrawal), and a floating point value for **transactionAmount**, which updates **accountBalance**. A function called **printBalance**, which prints on the screen the **accountNumber** and **accountBalance.**	CO2
13	Define a class *Counter* which contains an int variable *count* defined as static and a static function Display () to display the value of *count*. Whenever an object of this class is created *count* is incremented by 1. Use this class in main to create multiple objects of this class and display value of count each time	CO2
14	WAP to add and subtract two complex numbers using classes	CO2
15	Write program to overload Binary + to add two similar types of objects. (Both with and without using friend functions)	CO3
16	WAP to implement += and = operator	CO3
17	Implement the following class hierarchy considering appropriate data members and member functions 	CO3
18	Implement the following hierarchy considering appropriate data members and member functions (use Virtual functions). 	CO3
19	WAP to convert meter to centimeter and vice versa, using data conversions and operator overloading	CO3
20	WAP to count digits, alphabets and spaces, stored in a text file, using streams	CO4

Note:
1. In total 15 practical to be implemented. 2 additional practical may be given by the course instructor.
2. This is a suggestive list of programs. However, the instructor may add programs as per the requirement of the course.